Approved by the Regents
May 19, 2016

PROMOTION RECOMMENDATION
THE UNIVERSITY OF MICHIGAN
MEDICAL SCHOOL
DEPARTMENT OF PSYCHIATRY

Mary M. Heitzeg, Ph.D., assistant professor of psychiatry, Department of Psychiatry, Medical School, is recommended for promotion to associate professor of psychiatry, with tenure, Department of Psychiatry, Medical School.

Academic Degrees:

Ph.D.	1999	University of Michigan
M.A.	1995	University of Michigan
B.S.	1990	GMI Engineering and Management Institute, Flint, MI

Professional Record:

2015-present	Adjunct Assistant Professor of Psychology, University of Michigan
2012-present	Assistant Professor, Department of Psychiatry, University of Michigan
2010-2012	Research Assistant Professor, Department of Psychiatry, University of Michigan
2004-2010	Research Investigator, Department of Psychiatry, University of Michigan
1999-1999	Lecturer, Department of Psychology, University of Michigan

Summary of Evaluation:

Teaching: Dr. Heitzeg's teaching activities consists of mentorship in her research group, focusing on fostering critical independent thinking in evaluation of the literature and teaching how to develop and test hypotheses. Research trainees in her group have published six first author publications for which she served as a senior author, including several in high-impact journals. One trainee received an NIH/NIDA career development award (K01), for which Dr. Heitzeg continues as her mentor. Two others have MICHR Post-doctoral Translation Scholar (PTSP) applications pending. She gives lectures and seminars to undergraduates, graduate students and post-doctoral fellows, and offer opportunities for local high school students to learn about neuroimaging and substance abuse research through a formal educational experience in her lab.

Research: Dr. Heitzeg is funded on an NIH/NIAAA R01 (Neurocognitive Risk for Alcoholism into Adulthood; MPI: Zucker/Heitzeg; 2005-2016), which targets high-risk individuals transitioning from adolescence to young adulthood (aged 18-21 at first scan) for longitudinal neuroimaging. This is a critical developmental period as it is normatively the interval of highest alcohol and other drug consumption in the life course. Furthermore, the functional tasks are the same as those employed with the NIDA study in the younger sample, probing emotion,

behavioral regulation and the incentive motivation system; therefore, as the younger cohort ages we will ultimately have a full picture of development from childhood, through adolescence, into early adulthood. This ability to characterize these critical neural systems over time, and to map changes in neural response patterns associated with both risk for alcohol and other drug problems and with actual substance use and consequences, is unique in the field. The innovation and importance of this work is evidenced by the high-impact journals they have published in including *Molecular Psychiatry*, *Biological Psychiatry* and *Journal of Neuroscience.*

An important feature of the work described above is the high-risk nature of participants. These are recruited from a larger longitudinal family study of children of alcoholics, the Michigan Longitudinal Study (MLS). This study was started by Robert Zucker, Ph.D. and has been ongoing for approximately 28 years. Dr. Zucker's role as the PI of the MLS makes him a logical multiple PI (MPI) on the two R01s cited above. However, the development and implementation of this neuroimaging-focused research was entirely Dr. Heitzeg's own work. Furthermore, due to her critical involvement in expanding and articulating the overarching mechanistic structure of the domains investigated with the MLS and its offshoot projects for the latest competing renewal, she is now MPI on the MLS NIH/NIAAA R01 (Family Study of Risk for Alcoholism over the Life Course; MPI: Zucker/Heitzeg; 2013-2018).

In addition to her ongoing longitudinal research, Dr. Heitzeg has three R01s under review in collaboration with Brian Hicks. His expertise in developmental psychopathology is complementary to her expertise in developmental neuroimaging, make a powerful collaborative team. In these R01s they propose to investigate relationships between the development of inhibitory- and reward-related brain functioning and various outcomes, including substance use.

Dr. Heitzeg has also extended her investigation of the risky period of adolescence into the area of sleep research. She has a NIH/NIAAA R21 (Sleep homeostasis and neural circuitry of risky behavior in adolescents; PI: Heitzeg; 2014-2016) to investigate the impact of sleep changes during adolescence on impulsive behavior and brain function related to impulse control and reward responsivity. Data collection is just beginning, and the plan is to build on this work to secure funding for an R01 that would allow longitudinal measurements to track these relationships from childhood through adolescence with a view toward articulating how sleep changes in adolescences may relate to problem substance use.

Dr. Heitzeg has published 42 peer-reviewed articles in high-impact journals including *Biological Psychiatry* and *Journal of Neuroscience.* Dr. Heitzeg received the Outstanding Early Career Investigator Award from the Division of Clinical Neuroscience and Behavioral Research at NIDA, and was an invited speaker at their monthly seminar series. Perhaps the best demonstration of her recognition at the national level involves a new NIH initiative on Adolescent Brain and Cognitive Development (RFA-DA-15-014/ 015/016). This is a cooperative grant to establish a national, multisite, longitudinal study to prospectively examine the neurodevelopmental and behavioral effects of substance use in 10,000 youth over a 10 year period. Given her established reputation in this area of research, two separate consortia approached her to join with them in an application. She has joined with one of these and is working closely with members across the nation to develop protocols and hypotheses based on

her own published and preliminary work, which highlights the importance of this work to the field.

Recent and Significant Publications:

Heitzeg MM, Nigg JT, Yau W, Zucker RA, Zubieta J-K: Striatal dysfunction marks preexisting risk and medial prefrontal dysfunction is related to problem drinking in children of alcoholics. *Biological Psychiatry* 68:287-295, 2010.

Yau W, Zubieta J-K, Weiland BJ, Samudra PG, Zucker RA, Heitzeg MM: Nucleus accumbens response to incentive stimuli anticipation in children of alcoholics:Relationships with precursive behavioral risk and lifetime alcohol use. *Journal of Neuroscience* 32:2544-2551, 2012.

Glaser YG, Zubieta J-K, Hsu DT, Villafuerte S, Mickey FJ, Trucco EM, Burmeister M, Zucker RA, Heitzeg MM: Indirect effect of corticotrophin-releasing hormone receptor 1 (*CRHR1*) gene variation on negative emotionality and alcohol use via right ventrolateral prefrontal cortex. *Journal of Neuroscience* 34:4099-4107, 2014.

Hardee JE, Weiland BJ, Nichols TE, Welsh RC, Soules ME, Steinberg DB, Zubieta J-K, Zucker RA, Heitzeg MM: Development of impulse control circuitry in children of alcoholics. *Biological Psychiatry* 76:708-716, 2014.

Heitzeg MM, Villafuerte S, Weiland BJ, Enoch M-A, Burmeister M, Zubieta J-K, Zucker RA: Effect of *GABRA2* genotype on development of incentive-motivation circuitry in a sample at risk for alcohol use disorder. *Neuropsychopharmacology* 39:3077-3086, 2014.

Service: Dr. Heitzeg has demonstrated her organizational citizenship through service on departmental and institutional committees, including two faculty search committees, and the Department of Psychiatry space allocation committee. She also served on the Operating Committee for the University of Michigan Substance Abuse Research Center, during which time she initiated and helped write a multidisciplinary junior faculty cluster hire proposal on the theme of adolescent substance abuse, which was awarded. Recently, she became a member of the Executive Advisory Committee for the University of Michigan Functional MRI Laboratory. Dr. Heitzeg has been an invited speaker at the prestigious Guze Symposium at Washington University and the 3rd International Conference on Applications of Neuroimaging to Alcoholism (ICANA) at Yale University. She served as a grant reviewer for two NIH special emphasis panels and five NIH Study Sections. She has also served as a reviewer for *JAMA Psychiatry* and *American Journal of Psychiatry*. Recently she earned membership into the American College of Neuropsycho-pharmacology, an honor bestowed to a highly select group of investigators.

External Reviewers:

Reviewer A: "...her publications are truly ground-breaking, providing insights into brain functioning from the perspectives of developmental epochs and genetic influences....Dr. Heitzeg is in the topmost ranks of her peers...She works at the crossroads of neuroimaging, developmental psychology and genetics, is one of a small cadre of researchers with such

interdisciplinary credentials, and is highly productive, well published and well-funded."

Reviewer B: "...she ranks nationally as one of the most accomplished scholars in our field among her peers....She is a leader advancing [the] field, one of the most accomplished scholars among her peers, an she would certainly qualify for this promotion at my institution."

Reviewer C: "Her research has been recognized with good grant support, and she is clearly an active and sought-after scientific collaborator....Most of her publications feature trainees as coauthors. She is active as a teacher, mentor, and educator in a variety of roles including didactic courses, lectures, and individual mentorship. She is highly regarded in this role and makes an important contribution to the institution."

Reviewer D: "Dr. Heitzeg's studies, which she publishes in the highest tier journals in neuroscience and psychiatry (including the Journal of Neuroscience, Biological Psychiatry, etc.), are timely, innovative and rigorous....In my view Dr. Heitzeg is well recognized as a leader in the field of neuroimaging of risk for substance abuse and her chance of rising in the leadership ranks is very good."

Reviewer E: "...I am confident that Dr. Heitzeg is a thoughtful, well-informed and innovative researcher with a tremendous amount of enthusiasm for her research topic areas, who has, and will continue to contribute significantly to understanding the neural basis of vulnerability to addictive disorders."

Summary of Recommendation:

Dr. Heitzeg has a national reputation and has made a unique contribution with her independent research. I am pleased to recommend Mary M. Heitzeg, Ph.D. for promotion to associate professor of psychiatry, with tenure, Department of Psychiatry, Medical School.

Marschall S. Runge, M.D., Ph.D.
Executive Vice President for Medical Affairs
Dean, Medical School

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